Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

ON THE CICINDELINÆ OF ANGOLA.

BY F. CREIGHTON WELLMAN, M.D., F.E.S., AND WALTHER HORN, M.D.

Very little has been known until now about the Cicindelinæ of Angola. Most of the species described are represented by uniques or a few specimens, excepting, of course, those occurring in other parts of Africa. The discovery of the "typical" Angolan forms is almost entirely connected with the names of four collectors, namely: Friedrich Welwitsch, the distinguished Austrian botanist who collected for the Museum of Lisbon; A. v. Hohmeyer and Dr. P. Pogge, whose collections now belong to the Royal Zoological Museum of Berlin, and Major von Mechow, whose specimens are at present in the collection of Réné Oberthür. These last were described by Quedenfeldt, Sr., Harold worked up the material for the Berlin Museum, and Putzeys published concerning the Portuguese collections.

Beyond these only a few species, mostly based on single specimens and some without exact localities, have from time to time been sent to Europe, most of them described by one of the authors of the present paper (W. H.).

While not less than six genera in thirty-five species[1] are known from this so highly interesting part of Africa, yet this is the first time that large material with exact bionomical notes has become available —material which permits of a distinct advance in our knowledge of this interesting family. It seems, therefore, a suitable opportunity to present our notes on the habits and relations of the species occurring in Angola, and we have made the list complete by including the species reported by other observers as well as ourselves. One very peculiar and interesting new form is described.

In taking up a faunistic study of this kind it is always interesting to note the general features of the climate, soil and flora of the region discussed, as these must always have a bearing on the habits and distribution of its animal life. For the purposes of this paper our district may be divided into three regions: lowlands, mountainous slopes, and plateau. The first of these extends from the sea to a point 30 to 100 miles inland, according to the configuration of the country, and its most typical plant may be said to be the cocoanut palm, which will grow wherever moisture enough is obtainable. The soil is over parts of this belt strongly calcareous, being of recent geological formation, abounding in various fossils such as ammonites and trilobites. Other parts are the result of silt being carried down by erosion of the older interior mountains. The rainfall in this part is very scanty, as the storms come from the east and are intercepted by the highlands and mountains, only the heaviest and most general rains for a small portion of the year reaching the lowlands to the west. The vegetation is in consequence sparse, consisting of a few shrubs and thorny or fleshy trees. The grass grows in little discrete clumps and dries up and almost disappears during the greater part of the year. In this region only five species of Cicindelinæ were encountered: *Cicindela brevicollis intermedia* Klug, *C. melancholica* F., *C. nitidula* Dej., *C. cabinda* Bat. and *Eurymorpha cyanipes mouffleti* Fairm., the last three of which occur on the seashore.

---

[1] Twenty species of these were taken in Angola by one of us (F. C. W.) during 1906–08.

The second region may be said to extend inland from the first region to a point marked by the limits of the occurrence of the baobab tree (*Adansonia digitata*). The basis of this is a vast primary system consisting of various metamorphic rocks, chiefly granite and sandstone The soil is a sandy loam alternating with red clays. Of course, there is a great mixture of soils in the lower levels and valleys of this region. Huge granite mountains and boulders abound. The vegetation is very dense in canons and valleys and along rivers; and in the rainy season the grass is often long, coarse and dense, forming a sort of jungle. Many large trees (Anonaceæ, Anacardaceæ, Guttiferæ, etc.) abound in the jungles near streams. The most inland valleys of this region have a flora approaching that of the highland region yet to be described, and it was here that most of the species discussed in this paper were taken, our specimens including *Cicindela Mechowi* Qued., *C. lutaria* W. Horn, *C. saraliensis* Guér., *C. uncivittata* Qued., *C. infuscata* Qued., *C. Putzeysi.* W. Horn, *C. angusticollis* Boh., *C. villosa* Putz., *C. flavipes* Putz., *C. Wellmani* W. Horn, *C. reticostata* n. sp., *Odontochila erythropyga* Putz., *Cosmema Wellmani* W. Horn, *C. marginepunctata* W. Horn, *C. auropunctata* Qued., etc. The climate of this region is intermediate between that of the foregoing and that of the region about to be described, being cooler and moister than the lowlands, without equalling in these respects the highlands.

The third region is the high plateau forming the Bihé and parts of the Bailundo and Andulo countries. This is part of the alpine region of Africa, and is to be classed with Abyssinia, Ruenzori and the Nyassa-Tanganyika highlands. The soils are about as in the middle region and the country is, geologically speaking, very old, being entirely underlaid with archaean metamorphic rocks. The grass is comparatively short and thickly set together, quite covering the ground. The bulk of the trees are Leguminosæ and are as a rule not large, forming what is known as "bush." One of the Rosaceæ (*Paranarium mobola*) is the largest and most striking tree. Many Malvaceæ and Ampelidæ add to the smaller aspects of the landscape. The climate is moist and cool and is essentially subtropical and not tropical. The species found in the center of this last region are *Cicindela suturalis* Putz., *C. Mechowi* Qued., *Ophryodera rufomarginata* Boh., and *Mantichora congoensis*" Pér. At the western border of this region, almost at a point where it joins the second region (*vide suprà*) were taken several other species, namely: *Cicindela angusticollis* Boh., *C. uncivittata* Qued., *C. infuscata* Qued., *C. Putzeysi* W. Horn, *C. flavipes* Putz., *C. villosa* Putz. and *Cosmema auropunctata* Qued.

Following is a list of all recorded species[2] from Angola, including our own material, much of which is here reported for the first time, together with our notes on the habits of the beetles and the description of a new species.

CICINDELINÆ.

CICINDELINI.

Odontochilina.

1. **Odontochila erythropyga** Putz., Jorn. Sci. Lisb., 1880, p. 24.
 = *variventris* Qued., Berl. Ent. Zeitschr., 1883, p. 245.

Without exact locality (Welwitsch); Malange (Mechow); Ekekete Mountain, two hours south of Ekuiva River, November, 1907 (Wellman). The specimens were taken in thin grass near a large swarm of Meloid beetles (*Lytta amethystina*) which at some distance they distinctly resembled.

Cicindelina.

2. **Cicindela aulica** Dej., Spec. V, 1831, p. 250.

Without exact locality (Welwitsch). An intermediate form between the typical *aulica* and the subsp. *polysita* Guér. occurs in Loanda.

3. **Cicindela asperula** Duf., Ann. Sc. Phys., VIII, 1821, p. 359, pl. 130, f. 1.

Kuango (Mechow).

---

[2] All the material collected by Wellman is in W. Horn's collection, where also all the other species are represented, except *Cicindela leucopicta* Qued.

4. **Cicindela nitidula** Dej., Spec. I, 1825, p. 120.

Without exact locality (Welwitsch); Landana, Loango (U. More); Lobito Bay, April, 1908 (Wellman). Taken on the beach (that part which is kept more or less wet by the tides), and by its coloring the beetle is rendered inconspicuous as it sits on the sand, and is usually noticeable only when flying.

5. **Cicindela cabinda** Bat., Cist. Ent. II, 1878, p. 331.

Landana, Loango (U. More); Lobito Bay, April, 1908 (Wellman). Habits exactly like *C. nitidula*, with which it was found in company.

6. **Cicindela brevicollis clathrata**[3] Dej., Spec. I, 1825, p. 115.

Mossamedes.

brevicollis neglecta[4] Dej., Spec. I, 1825, p. 114.

Malange (Mechow); without exact locality (Welwitsch). There occurs near Mossamedes an intermediate form between this last and the var. *damara* Pér.

brevicollis discoidalis Dej., Spec. I, 1825, p. 114.

Kuango.

brevicollis intermedia Klug, Monatschr. Berl. Acad., 1853, p. 245.

Quanza (Homeyer), Loanda.

7. **Cicindela uncivittata**[5] Qued., Berl. Ent. Zeitschr., 1883, p. 242.

Malange (Mechow); north bank of Ekuiva River, November, 1907 (Wellman). Found on the path, dark soil.

exigua[6] Kolbe, Ent. Nachr., 1885, p. 50.

South bank of Ekuiva River, November, 1907 (Wellman), clayey soil.

8. **Cicindela obtusidentata** Putz., Jorn. Sci. Lisb., 1880, p. 22.

Bocagei Chd. *in litt.*, Cat. Coll. Cic., p. 28.

Without exact locality (Welwitsch).

9. **Cicindela wellmani** W. Horn, Deutsch. Ent. Zeitschr., 1907, p. 421.

Chiyaka, November, 1906, and November, 1908 (Wellman). In paths or on other bare places, clayey soil, on which the coloring of the beetle makes it hard to see. Very ant-like in its movements.

---

[3] Putzeys gave to this subspecies (and some specimens of the following) the wrong name *Cicindela senegalensis*, cf. *Jorn. Sci. Lisb.*, 1880, p. 21.

[4] Putzeys thought this to be *Cicindela pudica* Boh., cf. *Jorn. Sci. Lisb.*, *l.c.*

[5] This is the blackish form.

[6] This is the brownish form.

10. **Cicindela mechowi**[7] Qued., Berl. Ent. Zeitschr., 1883, p. 248, pl. 3, f. 3.

Malange (Mechow), Huilla (Welwitsch), Kakonda, Duque de Bragança, Bihé, Chiyaka, Ekuiva River (Wellman). Several forms occur, with and without white sutural stripe, both brownish and green. These beetles appeared to be very scarce until a large artificial bare place was prepared, when *mechowi* and several other species appeared in great numbers. The brownish form usually appears on clayey soil. When alive they have a strong verbena-like smell. They are strong flyers and very pugnacious. A specimen kept over night in a cage with some other beetles was found next morning chewing the thorax of a Meloid beetle (*Eletica rufa* F.).

11. **Cicindela grandis** W. Horn, Ent. Nachr., 1897, p. 240.

Without exact locality, one single ♀.

12. **Cicindela prodotiformis** W. Horn, Deutsch. Ent. Zeitschr., 1892, p. 88; 1894, pl. 3, f. 7.

Without exact locality, one single ♀.

13. **Cicindela leucopicta** Qued., Berl. Ent. Zeitschr., 1888, p. 157.

Lunda kingdom (between Kuango and Loango), 1 ♀ (Mueller), 10, IX, 1884, on open places of the savannas.

14. **Cicindela interrupta** Fabr., Syst. Ent., 1775, p. 225.
graphica Bat., Cist. Ent., II, 1878, p. 330.

Kuango (Mechow); without exact locality (Rogers); common.

15. **Cicindela saraliensis** Guér., Rév. Zool., 1849, p. 80.
flammulata Qued., Berl. Ent. Zeitschr., 1883, p. 241, pl. 3, f. 1.

This last is nothing but a form with more yellow spots on the elytra. Malange (Mechow); Chiyaka, Mt. Elende, November, 1906; Ekuiva River, November, 1907 (Wellman). Our specimens are the *flammulata* form, and were found on dark soil. The beetle does not fly, and is often found in the edge of woods *near* certain *Cosmemæ*, but not *with* them. On one occasion a living specimen was taken with an ant (*Pheidole punctulata* Mayr.) hanging to its leg.

16. **Cicindela angusticollis** Boh., Ins. Caffr., I, 1848, p. 15.

Mossamedes, Chiyaka, November, 1906; Ekuiva River, November, 1907 (Wellman). Does not fly, a very rapid runner; common.

17. **Cicindela muata** Har., Mittheil. Münch. Ent. Ver., 1878, p. 99.

Malange (Mechow); interior (possibly Congo Free State), without exact locality (Pogge).

---

[7] *Cicindela lugubris* Putz., *Jorn. Sci. Lisb.*, 1880, p. 22, is the true *C. mechowi.*

18. **Cicindela (Ophryodera) rufomarginata**[8] **bohemani** Pér., Ann. Mag. Nat. Hist., 1888, p. 220.

Huilla. There also occur individuals with less broadly confluent pattern.

rufomarginata poggei Har., Mittheil. Münch. Ent. Ver., 1878, p. 99; Col. Hefte, 1879, p. 11, pl. 1, f. 1.

Interior (perhaps Congo Free State) without exact locality (Pogge).

rufomarginata distanti Heath, Entomol., 1905, p. 97.

Duque de Bragança, Bihé, Kuango (Mechow), Lunda (Buchner), Chipeyo, November 18, 1906 (Wellman). Found on white sand. Flies rather heavily.

rufomarginata richteri[9] W. Horn, Deutsch. Ent. Zeitschr., 1892, p. 72; 1894, pl. 3, f. 9; 1906, pl. 1, f. 16.

Malange (Mechow).

19. **Cicindela reticostata** nov. spec.

Cicindelæ quadricostatæ W. Horn ♀ affinis, differt statura minore; labro medio non producto, parte centrali dentes 3 ferente a lobis lateralibus incisura majore separata; prothoracis parte media globosiore, lateribus ad strangulationem basalem magis curvatis (ita ut pars basalis distinctior appareat), disco sulcum basalem versus evidenter magis declivi, superficie æqualiter grosse sed irregularius rugata atraque; elytris fere parallelis, solummodo in medio levissime ampliatis, humeris latioribus quam in illa specie, apice (conjunctim) brevius rotundato, signatura nulla, sculptura æqualiter subtili, sed punctis reticularibus fere ubique variis in directionibus (aut transversaliter, aut longitudinaliter, aut oblique aut in lineis distincte curvatis) confluentibus: rugis hoc modo formatis non quam cetera sculptura grossioribus; "striis" 2 vix elevatis basi incipientibus fere longitudinalibus (perparum suturam versus postice vergentibus) indistinctis in utroque elytro visibilibus (irregularius confluenter quam partibus adjacentibus sculptis), altera prope suturam ultra medium, altera in disco centrali fere ad medium ducta, postice sensim evanescentibus; 3^a etiam leviore indistinctioreque in disco laterali ante medium omnino disparente solummodo visu obliquo percipienda; depressionibus ("sulcis," ut ita dicam) inter has 3 "strias" (quæ vix costulæ possunt nominari) et spatio juxtasuturali modice cuprascentibus; antennis non foliaceis, articulis 5°–8° solummodo paullo dilatatis; palpis (articulo ultimo nigro) flavis; capite elytrisque nigricantibus opacis, vix hinc inde perparum æenescentibus; corpore subtus modice nitente nigricante; genis anticis, meta-episternis cum parte adjacente metasterni, elytrorum epipleuris cyanescentibus; pedibus, coxis, trochanteribus nigricantibus, hinc inde perparum viridi aut æneo-variegatis; totis pectoris partibus (metasterni parte discoidali et postico-centrali nuda), abdominis et coxarum posticarum lateribus late modice dense breviter pilosis; fronte nuda, solummodo prope antennarum insertionem setis 2 ornatis, pronoto in specimine unico nudo (semper?); 2 primis antennarum articulis nudis, 3° et 4° supra breviter modice sparsim setosis. Long. 17 mm. (sine labro).

---

[8] *Ophryodera rufomarginata,* as recorded by Putzeys, consists of the subspecies *bohemani* and *distanti,* cf. *Jorn. Sci. Lisb.,* 1880, p. 25.

[9] Recorded by Quedenfeldt as *O. rufomarginata, vid. Berl. Ent. Zeitschr.,* 1883, p. 247.

A single ♂ from the Enyalanganja or great plains, 3 hours south of the Ekuiva River, November, 1907 (Wellman).

It is one of the most peculiar species of the whole genus, belonging to the interesting *laeta-quadristriata* group, reported only from the tropics of Africa. The labrum is black with a testaceous patch in the middle, the 3 middle teeth are just a little less prominent than the lateral tooth. Front and pronotum are roughly and deeply wrinkled. The sutural angle of the elytra is rectangular without a developed spine. All tarsi, as in *Cicindela quadristriata,* sulcated. The 1st, 3d and 4th articles of the antennæ are on their upper part slightly carinate.

The size, color and sculpture of this species, and especially its *movements,* lend it when alive the appearance of a Carabid. It did not attempt to fly when pursued, although it was in bright sunshine.

20. **Cicindela villosa** Putz., Jorn. Sci. Lisb., 1880, p. 22.
= *semicuprea* Qued., Berl. Ent. Zeitschr., 1883, p. 244.

Malange (Mechow); Huilla (Lobo d'Avila); Chipeyo, November, 1906; Chiyaka, Ekuiva River, November, 1907 (Wellman). Taken on dark soil, often in short grass. It has a good cryptic coloring and is hard to see.

21. **Cicindela flavipes** Putz., Jorn. Sci. Lisb., 1880, p. 23.
= *nubifera* Qued., Berl. Ent. Zeitschr., 1883, p. 243, pl. 3, f. 2.

Malange (Mechow); Duque de Bragança; Chipeyo, November, 1906; Chiyaka, Ekuiva River, Kasenya Mines, November, 1907 (Wellman). This species occurs almost entirely on feldspathic soil, against which its indistinct light-colored markings make it almost impossible to see, except when it is in motion. It was only taken once or twice on red or dark soil, but one could count on finding it in abundance as soon as a bit of whitish soil rich in kaolin was reached.

22. **Cicindela suturalis** Putz., Jorn. Sci. Lisb., 1880, p. 25.

Huilla (Lobo d'Avila), Bihé, December, 1906 (Wellman). Taken in short grass, after most Cicindelidæ had disappeared.

23. **Cicindela Putzeysi** W. Horn, Deutsch. Ent. Zeitschr., 1900, p. 207.

Kakonda; Chiyaka, November, 1906; Ekuiva River, 1907 (Wellman). This reddish species almost always occurred on clayey soil, and usually together with *C. mechowi* (*vide suprà*) In Chiyaka it was taken on the artificial bare place made for the purpose of attracting Cicindelidæ. A peculiar point noted is that this beetle jumps and flies like a small grasshopper which is always found with it. On one occasion a large Asilid fly was observed to catch a specimen of *C. putzeysi.*

24. **Cicindela infuscata** Qued., Berl. Ent. Zeitschr., 1883, p. 245.

Malange (Mechow); Chipeyo, November, 1906; Chiyaka, Ekuiva River, November, 1907 (Wellman). Three forms occur: coppery, green and blackish. It was noted that the coppery form occurred in the valleys on clayey soil, together with *Cicindela mechowi* and *C. putzeysi,* while the green form was taken on the mountain sides among moss, etc., in company with *Odontochila erythropyga* (*vide suprà*).

25. **Cicindela melancholica** Fabr., Ent. Syst., Suppl., 1798, p. 63.

Malange (Mechow); Chincoxo, without exact locality (Welwitsch); Loanda (Hohmeyer); Benguella, edges of city, April, 1908 (Wellman). This species was taken on mud from partially dried-up pools; very common. In the same places (on the dry sand around the pools) occurred great numbers of a Carabid beetle (*Graphipterus* sp.).

26. **Cicindela vicina** Dej., Spec. V, 1831, p. 244.

Without exact locality (Welwitsch).

27. **Cicindela lutaria** Guér., Rev. Mag. Zool., 1849, p. 118; Mag. Zool., 1845, pl. 161, figs. 5, 6.

Ekuiva River, November, 1907 (Wellman). This species was found at the edge of the river, in a place which had been previously overflowed. The habits seem to be identical with those of *Cicindela melancholica.*

28. **Cicindela octoguttata** Fabr., Mant., I, 1787, p. 187.

29. **Eurymorpha cyanipes mouffleti** Fairm., Ann Soc. Fr., 1856, p. 95.

Cape Negro, Mossamedes.

Dromicina.

30. **Dromica tricostata** W. Horn, Ent. Nachr., 1897, p. 237.

Without exact locality; a single ♀.

31. **Dromica (Cosmema) auropunctata** Qued., Berl. Ent. Zeitschr., 1883, p. 249, pl. 3, f. 4.

Malange (Mechow); Chiyaka, Chipeyo, November, 1906 (Wellman). This species may be found in rather thick bush, and when pursued will hide under dry leaves like ants, which insects it greatly resembles in its movements.

32. **Dromica (Cosmema) marginepunctata** W. Horn, Notes Leyd. Mus., 1908, p. 32.

Chiyaka, Ekuiva River, November, 1907 (Wellman). Is even more shade-loving than the preceding (which is often found in the open) and occurs in enormous numbers in the bush. Its habits are like *auropunctata.*

33. **Dromica (Cosmema) wellmani** W. Horn, Notes Leyd. Mus., 1908, p. 31.

Ciyaka, Ekuiva River, November, 1907 (Wellman). Habits just like the preceding species, which it so closely resembles that it is impossible to distinguish them in the field and in company with which it usually occurs.

MEGACEPHALINI.

Megacephalina.

34. **Megacephala regalis** Boh. Ins. Caffr., I, 1848, p. 2.

Cuissange, 1 ♂; near Impulu River, November, 1899, 1 ♂. Both of more elongate elytra than the typical form.

MANTICHORINI.

35. **Mantichora congoensis** Pér., Ann. Nat. Hist., 1888, p. 219.
= *Livingstonei* Har., Col. Hefte, 16, 1879, p. 9.

Bihé; interior without exact locality, possibly Congo Free State (Pogge).

In conclusion: there are still two species of *Cicindela* known in tropical Africa, and very common to the north, east and south of Angola, which almost surely occur in Angola itself, although not yet found there, namely, *Cicindela nilotica* Dej. and *C. dongalensis imperatrix* Srnka. It is also probable that the common *Cicindela regalis* Dej., which is widespread in the regions to the north, east and southeast of the district here discussed, will be one day reported from Angola. *Cicindela cincta* Fabr., the common species reported from the mouth of the Senegal to Bahr-al-Ghazal and the Kassai, may likewise touch the boundaries of Angola somewhere.